Pharmacy

Abreviations

- **Abbreviations -** There will be some commonly used medical abbreviations in the calculation problems and also on other exam questions. You should become familiar with these because you will encounter them in practice when reading orders from other providers.

- ac before meals
- ad right ear
- as left ear
- au each ear (both ears)
- bid twice a day
- gtt. drop
- hs. at bedtime
- NPO nothing by mouth
- Qam every morning
- od right eye
- os left eye
- ou each eye (both eyes)
- pc after meals
- po by mouth
- prn when required
- qd every day
- qh every hour
- qid four times a day
- qod every other day
- tid three times a day

Math

- Metric System
- Conversion factors
- Percents
- Algebra/Ratio and proportion
- Dose formulae

Metric System

- Based on intervals of 100
- Weight
  - 1 gram = weight of 1 cubic centimeter of water
  - 1 decagram = 10 grams
  - 1 kilogram = 1000 grams (about 2.2 pounds)
- Length
  - 1 centimeter = about a half inch
  - 1 meter = about a yard
  - 1 kilometer = about 2/3 mile
- Liquid
  - 1 milliliter = 1 cc
  - 1 liter = 1000 ml (or cc) = about a quart

prefixes

- Deca = 10
- Kilo = 1000

- Deci = 1/10
- Centi = 1/100
- Mille = 1/1000
- Micro = 1/1,000,000

Conversion factors

- 1 kg = 2.2lb
- Medications are dosed in kg but patients often report their weight in pounds
- Example – If a patient weighs 154 pounds they weigh 70kg (154lb/2.2lb/kg =70kg)

Grain

- 1 gr = 65mg
- Grain (gr) is a unit of measure from the apothecary system of measure. This system is an old system of measure that should no longer be used on a regular basis. However, it still appears periodically in medicine.
- The most common example is an order for a 5 gr aspirin. Just remember a 5 grain aspirin is equal to 325mg.

Teaspoons to milliliters

- Know how to convert teaspoons or tablespoons to milliliters (ml).
- Medical professionals calculate liquid medications in milliliters but teaspoons and tablespoons are still the common household method to dose medications.

1 tsp = 5ml

1 tbsp = 15ml

Ounces, Pints and Quarts

- When you prescribe liquid medications you will be required to request the amount desired in milliliters.

- 1 fluid ounce = 29.57ml (It is more common to use 30ml)
- 1 pint = 473ml (Many commercial medication products will come in 480ml bts because the companies use the 30ml per ounce conversion).
- 1 quart = 946ml

Percents

- Percent means “parts per hundred”. There are three possible percent measures in medications.

- Weight/Weight Percent (W/W%) is defined as the number of grams in 100grams. Example 1% hydrocortisone cream has 1gram of hydrocortisone in each 100grams of cream.

- Weight/Volume Percent (W/V%) is defined as the number of grams in 100 milliliters.
- Example 5% dextrose in water (D5W) has 5 grams of dextrose in 100ml of water.
- **Hint –** This is the most common percent problem you will face in this course and in practice. When you see percent think **Grams per 100ML.**

- Volume/Volume Percent (V/V%) is defined as number of milliliters in every 100 milliliters of solution.
- Example 70% alcohol contains 70ml of alcohol in every 100ml of solution.

Algebra/Ratio and proportion

- **Ratio and Proportion –** Most of the problems you encounter in this course can be worked by simple “Ratio and Proportion” calculations.

For example above we learned that 1grain was equal to 65mg. How could you answer the question “how many mg in a 5 grain aspirin?” using a ration and proportion?

1. Set the problem up as two relationships ---

$$\frac{1gr}{65mg} = \frac{5gr}{Xmg}$$

Make sure and keep the units the same

2. Now Cross Multiply and divide

Multiply 65mg x 5grains = 325mg grain

Divide 325mg grain / 1 grain = 325 mg

Example problems – Here are some problems similar to ones you will encounter on exams.

You want to administer 400mg of Ampicillin IM to a patient. How much of the reconstituted solution will you administer? (use the reconstitution instructions from the label below)

Ampicillin Sodium

1 gram

Reconstitution instructions – Add 3.4 ml of sterile water for Injection. Resultant solution will contain 250mg/ml

Answer

1.6ml

You have a 6-year-old 66-pound child who requires a liquid medication. The required dose of the medication is 25mg/kg/day given qid. The concentration of the suspension is 150mg/5ml. How many milliliters will the child take for each dose?

Answer

6.25ml

You want to start a 192.5lb man on heparin starting with an 80U/Kg loading dose. The only heparin you have is a 10ml vial with a concentration of 5000U/ml. How many ml will you need for the loading dose?

Answer

1.4ml

You want to use mannitol for the reduction of intracranial pressure in a 154lb man. You want to use 1.5g/kg and you have a 20% mannitol solution. How many ml of the solution do you need?

Answer

525ml

The parenteral dose of Trimethoprim/sulfamethoxazole (Bactrim) is 20mg/kg per day (based on the trimethoprim component) given every 6 hours. The strength of Bactrim IV is 400mg sulfamethoxazole and 80mg of trimethoprim per 5ml. The patient you are treating weights 176 pounds. How much of the Bactrim IV should be added to a 250ml bag of normal saline IV solution for each dose?

Answer

25ml

IV ampicillin is indicated in a 2y/o female with an upper respiratory infection of bacterial origin. The recommended dose is 100mg/kg/day in 4 divided doses. She is 33 lb. The ampicillin you have is 30mg/ml. Calculate the amount of ampicillin that you will give as a single IV push dose?

Answer

12.5ml

You have a 70kg patient with Zollinger-Ellison syndrome going to surgery. You are going to use a continuous IV of ranitidine (Zantac) to control gastric acid hypersecretion. The dose you want to use is 2mg/kg per hour. The concentration of the ranitidine is 25mg/ml. You want to make an IV bag that will last for 24 hours. How many ml of ranitidine do you put in the bag?

Answer

134.4ml

You want to start a 0.1Unit/Kg/hr insulin IV infusion on an 80Kg patient. You have an IV bag that contains 50units of insulin in 500ml of normal saline. How many ml per hour do you run the infusion at?

Answer

80ml/hr

You have a young child who is currently taking 1.2ml of Acetaminophen (Tylenol) drops that have a concentration of 100mg/ml. You want to convert the child to an equal dose using Acetaminophen elixir that has a concentration of 160mg/5ml. How many ml of the elixir equal 1.2ml of the drops?

Answer

3.75ml

You have a 198 pound patient who has overdosed on acetaminophen (Tylenol). The loading dose is 140mg/kg and the maintenance dose is 70mg/kg. You have 20% acetylcysteine solution in stock. How many ml of acetylcysteine will need for both the loading dose and the first maintenance dose?

Answer

94.5ml

A patient requires Phenobarbital elixir (15mg/5ml) for maintenance therapy. The patient is a 7-year-old male who weighs 66lb. The dose of Phenobarbital is 6mg/kg/day in three divided doses. What is the correct dose for this patient?

Answer

20ml TID

You need to calculate the dose in ml for albuterol 0.5% nebulizer solution. The child you are treating weighs 66lbs and you want to use a 0.15mg/kg/dose. How many ml of 0.5% albuterol solution do you need per dose?

Answer

0.9ml

End